

flight almost exactly the opposite of that followed by its fellows hatched in Denmark and north-east Germany.

Mr. J. H. Gurney in the course of his report on Norfolk birds for 1910 (*Zoologist* for May) alludes to the increasing scarcity of the corn-crake—which he attributes to the shooting of these birds in the south of France—and likewise to the recent visitation of crossbills. Most of the latter have departed, but when and where they went is another matter. A crane shot at Thornham in August was one of the rarities. In a note on the food of starlings, the author adduces evidence to prove that these birds are harmful to young wheat and oats, eating the sown grain as, or before, they sprout. On the other hand, they undoubtedly destroy large numbers of noxious insects.

Among several "Educational Leaflets" received from the American National Association of Audubon Societies, reference may be made to the so-called Virginian quail, or "Bob White" (*Colinus virginianus*), a bevy of which forms the subject of the illustration here reproduced. The



A Bevy of Californian Quail. From U.S. Educational Leaflet."

bird is a valuable asset to the United States, partly on account of the revenues derived from shooting rights and partly owing to the quantity of noxious insects and weeds it destroys. It is estimated that a family of a dozen quail would consume about 800,000 insects and 60,000,000 weed-seeds in the course of a year. When reposing, the members of a bevy arrange themselves in a circle with their heads directed outwards, and in such a position, except, of course, when snow lies on the ground, are stated to be almost invisible, even at a very short distance.

To the June number of *British Birds* Messrs. Ticehurst and Jourdain contribute an article, illustrated with maps, on the distribution of the nightingale in Great Britain, the subject being treated county by county. As regards the extreme south-western and northern limits of the range of the species, the authors endorse the view that neither in Devonshire nor Yorkshire has there been any extension within the period when, if it had occurred, it could be definitely traced. In Yorkshire, nightingales appear to have bred a century ago as far north as they normally do at the present day, occasional occurrences

beyond the usual range having probably occurred in the past in much the same manner as is the case nowadays. It is noteworthy that the range of the bird in Yorkshire is strictly limited to the lowlands, only one instance of its breeding above the 250-foot contour being recorded. The alleged instances of the occurrence of nightingales northward of Yorkshire are regarded as not proven.

In an article in *The Irish Naturalist* for June Mr. R. M. Barrington attributes the great rush of birds observed in the south-east of Ireland during the night of March 29 to a combination of special circumstances affecting the ordinary spring migration. Owing to the prevalence of north-east winds over a great part of Europe, the birds had probably to halt in the south, where they collected in numbers. At Valentia, Pembroke, and the Scilly Islands the wind veered to the south on March 29, although north-east winds continued over the rest of the British Isles. The night was moonless, and after the birds had crossed the Channel they encountered a bank of fog off Ireland, which caused their hosts to become disorganised and attracted first by the lighthouses and then by the lights of the towns.

Exquisite photographs of birds and other animals illustrate a pamphlet on the "Ross Bird-stalker," written by Mr. C. Dixon, and published by Ross, Ltd., New Bond Street. The pamphlet advertises a stereo-prism binocular, stated to be well fitted for the purposes of the field-naturalist.

R. L.

AMERICAN ETHNOLOGY.¹

THE study of the Chippewa songs and music collected by Miss F. Densmore in Minnesota is of exceptional interest. Every phase of Chippewa life is expressed in music. Many of the songs are very old, and are found in several reservations; others are said to be the more recent compositions of certain men who composed them "during a dream" or "upon awaking from a dream." It is still customary for the Chippewa to celebrate an important event by a song. None are the exclusive property of families or clans; a young man does not inherit the right to sing his father's songs, but if he likes he may learn them by giving the customary gift of tobacco. As with the songs of the Murray Islanders of Torres Straits, the melody is considered more important than the words. It is permissible and customary to compose new words for old tunes, but they are always similar in general character to the words previously used, the idea being the important thing. Indian songs are not recorded in a definite system of notation, and a standard of absolute exactness is lacking; the melody-trend and the principal rhythm of the song, however, are constant. "Indian music seems to belong to a period in which habit takes the place of scale consciousness. Habit in the choice of musical intervals is formed by following a line of least resistance or by a definite act of the will, or may be the result of both, the voice at first singing the intervals which it finds easiest, and afterward repeating these intervals voluntarily. . . . The present study is not an analysis of fractional tones, but of melodic trend and general musical character; therefore the ordinary musical notation is used, with the addition of a few signs in special cases." A vibrato or wavering tone is especially pleasing to the singers; it is difficult for them to acquire, and is considered a sign of musical proficiency.

The songs fall into several classes, such as Dream songs, War songs, Love songs, Moccasin-game songs, Woman's-dance songs, and *Mide* songs. The *Mide* (Grand Medicine) is the native religion of the Chippewa. It teaches that long life is coincident with goodness, and that evil inevitably reacts on the offender. Its chief aim is to secure health and long life to its adherents, and music forms an essential part of every means used to that end. Both men and women are eligible for membership. There are eight degrees, persons being advanced from one degree to another on receiving certain instructions and bestowing valuable gifts. Meetings are held in the spring of each year, but it is permissible to hold initiation meetings in the autumn.

¹ Smithsonian Institution, Bureau of American Ethnology. Bulletin 45.—"Chippewa Music." By F. Densmore. Pp. xix+216. Bulletin 37.—"Antiquities of Central and South-Eastern Missouri." By G. Fowke. Pp. vii+116. (Washington: Government Printing Office, 1910).

All members are expected to attend one meeting each year for the renewal of their "spirit power." The life enjoined on the members is a life of rectitude. They are taught that membership does not exempt a man from the consequences of his sins. Lying, stealing, and the use of liquor are strictly forbidden. Various stages of initiation are described, and the appropriate songs with their music are given, each of which is accompanied by a reproduction of the mnemonic pictograph. All the songs are recorded in mnemonics on strips of birch bark, each record serving as a reminder of the essential idea of the song. The following examples illustrate these pictographs.

The Medicine song, illustrated by a figure, is: "Light—Around you—Chief—Woman." The picture was drawn by a woman, who stated that the horizontal line represents the edge of the wigwam, along which are arranged various articles of value indicated by the dots. At each end are torches, the light of which falls on the gathered wealth, causing many of the articles to glitter. These articles belong to a woman standing with upraised hands and wearing a pearl necklace with a locket. In singing this song the woman pointed to one portion of the picture after another, tapping the birch bark lightly as she sang.

The fourth song (p. 59), for initiation into the Sixth Degree of the *Midewiwin* (Grand Medicine Society), is: "Who is this—Sick unto death—Whom I restore to life?" The pictograph represents the body of the person to be initiated, on whom are seen lines representing the "strength" he is to receive through the *Mide*. "The words of the song refer to the person who is being initiated. Many sick persons are initiated in order that they may be restored to health. The *Mide* comprehends health of body, mind, and spirit in one general idea." It is somewhat unfortunate that this short memoir is simply entitled "Chippewa Music," for on reading the title a non-musical person might be led to overlook a piece of work which, as we have seen, covers a much wider ground.

As the result of two seasons' field work, Mr. Gerard Fowke has published a memoir on the mounds near the Missouri river, mainly between Gasonade River and Moniteau Creek. The mounds were erected on narrow ridges, with no regard to orientation; each contained a vault with sides sloping outwards, and composed of irregular stones. They contained one or more skeletons, either doubled up or disarticulated, the flesh having been first removed; in these cases the bones sometimes appear to have been thrown carelessly into the vault. The bones were in such a decayed and friable condition that very few could be preserved or measured. Dr. A. Hrdlička states that most of the crania are of the dolichocephalic Indian type, two or three being extreme forms in this respect, suggesting similar specimens recovered in New Jersey from the burials of the Delawares and also from the mounds of the Illinois River. A large number of the vaults are figured, as well as objects found within them. The author states that:—"As the Osage Indians never ascended the Missouri farther north than the Osage River, and as the stone vaults above that point show progressively more skill in their construction, we must attribute them either to the Kansa Indians or to some tribe whose name is now lost."

A. C. HADDON.

RADIANT MATTER.¹

THE velocity with which helium is cast out by radio-active bodies at the moment of change varies considerably from one element to another. Thus the radiant atoms of radium C possess a far higher velocity than those of uranium or ionium. This fact is apparent in the greater distance to which the α rays of the former will penetrate in air or in any other substance. The distance traversed in air is known as the "range." The following table shows the ranges of α rays from the various known radio-active elements. Thus we see that whereas the helium from radium C is projected nearly 7 centimetres, that from uranium only reaches 2.7 centimetres. In the thorium series, one of the elements, thorium C, attains a range of 8.6 centimetres. This is the longest known.

¹ From a lecture delivered before the Royal Dublin Society on February 3, by Prof. J. Joly, F.R.S.

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Range in Air.

	cm.		cm.
Radium C	7.06	Thorium C	8.6
Radium A	4.83	Thorium X	5.7
Emanation	4.23	Thorium emanation ...	5.5
Radium F	3.86	Thorium B	5.0
Radium	3.54	Radiothorium	3.9
Ionium	2.8	Thorium	3.5
Uranium	2.7		
			cm.
		Actinium X	6.55
		Actinium emanation ...	5.8
		Actinium B	5.5
		Radioactinium	4.8

By a most ingenious series of observations, Bragg has revealed some unexpected and interesting features attending the ionisation effects of the α rays upon gases through which they are projected. By measuring the amount of ionisation effected at different points along the path of the ray, Bragg and Kleeman have shown that at first, when the velocity is greatest, the ionisation effected is least, and that the amount of ionisation—that is, the number of ions created—greatly increases just before the atom comes to rest.

Let the ray be supposed to move along the line AB—this line representing the range. If at each point of its

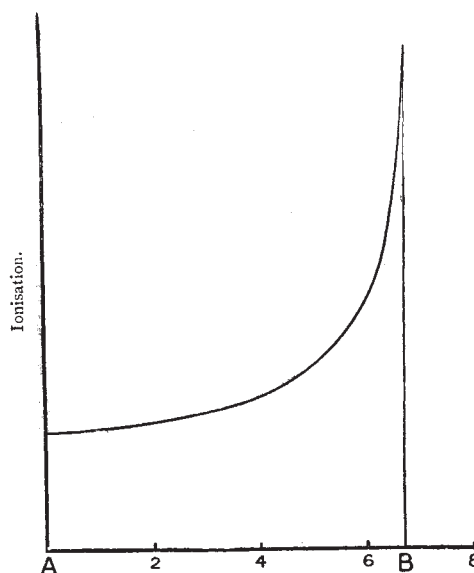


FIG. 1.—Range in cm. of air.

path we erect a perpendicular line proportional to the number of ions created by the flying helium atom, then, by joining up the ends of these lines, we obtain the curve shown. It will be noticed that a very well-defined maximum exists, after which the ionisation rapidly drops to nil. The curve reproduced is due to Geiger, who has added considerably to our knowledge of the subject.

Here is a small speck of the substance, pitchblende—the uranium ore from which radium is derived. All the elements of the uranium series are present. We are sure, then, that every α ray proper to this series, the ranges of which are given in the table, is being emitted by this particle of pitchblende. Let us form a mental picture of what is going on around it.¹

Farthest out of all, the helium from radium C is projected. It attains a distance of 7 centimetres. The greater part by far of its ionisation is done near the end of its flight. Hence, remembering that these rays are darting radially in all directions from the piece of pitchblende, there is a shell of intense ionisation of spherical form existing around this pitchblende, and at a distance

¹ This might, possibly, be realised by condensing water vapour upon the ions according to the method described by C. T. R. Wilson (Proc. R. S., June, 1911).